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(54) Composite fabric with mutually joined superimposed layers

(57) A composite fabric with mutually joined superimposed layers comprising at least one first layer (1) and at least one second layer (2) which are mutually joined by means of fibers of yarn (3) which protrude from one of the layers (1) and are inserted through the other one of the layers (2). The fibers (3) are retained in the other one of the layers (2) in order to provide a stable bonding of the layers (1,2).

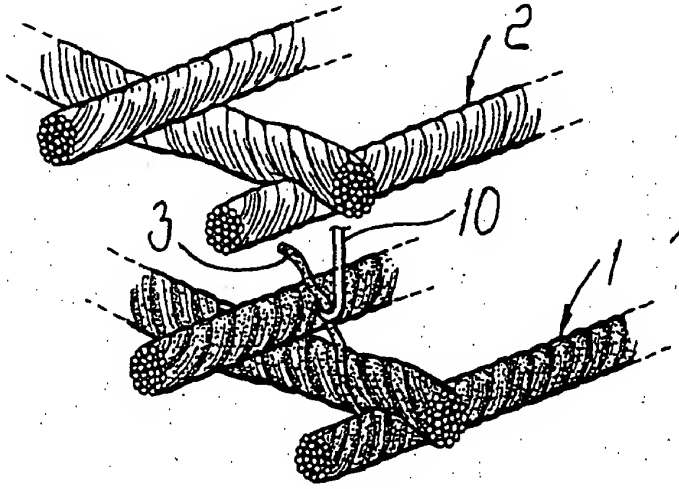

Fig. 1

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Description

[0001] The present invention relates to a composite fabric with mutually joined superimposed layers.

[0002] It is known that currently commercially available composite fabrics are generally obtained by using adhesives or plasticizers which allow to mutually join two layers.

[0003] This type of product has an extremely limited use and does not allow to produce fabrics with presettable tactile, mechanical, visual and aesthetic characteristics which can vary in each instance depending on the fabrics that are mutually bonded.

[0004] The aim of the present invention is to provide a new composite fabric which allows to mutually join two fabrics or in any case two layers, at least one of which is made of fabric, which can have mutually different characteristics and are joined mechanically by means of a stable coupling which produces a new and original product.

[0005] Within the scope of this aim, a particular object of the present invention is to provide a composite fabric which allows to mutually join, in an optimum manner, different products such as wool/viscose, viscose/nylon, acetate/viscose, cotton/polyester and so forth.

[0006] Another object of the present invention is to provide a composite fabric in which it is possible to mutually join already-made fabrics, thus allowing in practice to recycle fabric remnants, changing their outward appearance.

[0007] Another object of the present invention is to provide a composite fabric whose finish characteristics can be changed in each individual instance according to the type of fabric being used and according to the type of bonding being performed.

[0008] This aim, these objects and others which will become apparent hereinafter are achieved by a composite fabric with mutually joined superimposed layers, according to the invention, characterized in that it comprises at least one first layer and at least one second layer which are mutually joined by means of fibers of yarn which protrude from one of said layers and are inserted through the other one of said layers, said fibers being retained in said other one of said layers in order to provide a stable bonding of said layers.

[0009] Further characteristics and advantages of the invention will become apparent from the description of a preferred but not exclusive embodiment of a composite fabric with mutually joined superimposed layers, illustrated only by way of non-limitative example with the aid of the accompanying drawings, wherein:

Figure 1 is a highly enlarged-scale perspective view of the step for taking up the fiber from the lower fabric;

Figure 2 is a highly enlarged-scale perspective view of the insertion of the fiber of the lower fabric or layer in the upper fabric or layer;

Figure 3 is a schematic perspective view of a quilting machine for taking up the fibers from one layer and inserting them in the other layer;

Figure 4 is a schematic view of two superimposed layers, with a hook-shaped needle about to be inserted;

Figure 5 is a view of the insertion of the hook-shaped needle in two superimposed fabrics;

Figure 6 is a view of the return step of the hook-shaped needle, with the take-up of a fiber of the yarn of the lower fabric;

Figure 7 is a schematic view of the step of the exit of the hook-shaped needle and of the insertion in the upper layer of the fiber taken up from the lower layer.

[0010] With reference to the above figures, the composite fabric with mutually joined superimposed layers, according to the invention, is constituted by at least one first layer 1 and by at least one second layer 2 which are preferably constituted by fabrics or similar textile products obtained from yarns which are preferably twisted with more than 700/800 twists. Bonding is provided by taking up fibers, schematically designated by the reference numeral 3, from one of the layers, for example the first layer 1, and inserting them in the weft of the second layer 2, thus achieving a bonding which can be defined as mechanical.

[0011] In order to better clarify the inventive concept, it should be noted that the fiber that constitutes the yarn of one fabric in practice enters the weft/warp weave of any second fabric, becoming accordingly a means suitable to join the two fabrics.

[0012] As previously mentioned, the number of twists per unit of measure chosen that is given to the yarn becomes an important factor, since the tactile, mechanical, visual characteristics and accordingly the different quality of the fabrics are determined.

[0013] The count of the yarn is therefore crucially important.

[0014] For this purpose it should be noted that the count of yarns is the value that defines the degree of fineness of yarns by expressing it on the basis of length and weight parameters.

[0015] The count is determined by various measurements; in particular, the metric count, indicated by Nm, indicates the number of 1000-meter skeins required to reach a weight of one kilogram; the denier count Td instead indicates the number of grams per 9000 meters.

[0016] The so-called English count, designated by Ne, is also used. This count varies according to the type of material; in particular, for staple cotton and rayon, it indicates how many 840-yard (768-meter) skeins are required to reach the weight of one pound (0.454 kilograms); for wool, the measurement must be made using 560 yards (512 meters); for linen, hemp and jute, 300 yards (274 meters) are considered.

[0017] There is a relation among the above counts

which can be summarized with the following formula:

$$Td = \frac{5310}{Ne} = \frac{9000}{Nm}$$

[0018] An attempt is currently being made to unify these units of measure for counts by introducing the tex and, in particular, the decitex, which indicates the weight in grams of 10000 meters of yarn, so that one decitex corresponds to 1.11 Td.

[0019] With the above measurements, in the metric count Nm, the finer the yarn, the higher the count, while with the English or denier count system, the lower the count, the finer the yarn.

[0020] It should be added to the above that in the case of folded yarns, the count, unless it is specified for each component, in the direct system, i.e., in the English system and in the denier system is equal to the sum of the counts of the components of the yarn, while in the indirect system, i.e., in the metric count system, the relation of the count is such that the inverse of the count of the yarn is equal to the sum of the inverses of the individual counts of the yarns.

[0021] On the basis of the tests conducted, it has been found that optimum results are achieved with fabrics in which the yarns have an average count which can be determined from the following table:

Fabric	Average count
Cotton	20-40,000 Nm
Doubled cotton	40,000-50,000 Nm
Angora	115,000-135,000 Nm
Synthetic fibers	150 Td
Nylon	78-156 Td
Polyester	75-140 Td
Silk	40-60 Td
Viscose/silk velvets	28,000-36,000 Nm
Viscose	30 Ne

[0022] In order to achieve optimum results, the yarns that constitute a fabric must not be broken, so as to avoid reducing the mechanical strength of each layer.

[0023] Accordingly, the type of the fabrics to be bonded and the density of the treatment per centimeter become important; said density is determined by the nature and inherent elasticity of the fibers that compose the yarn and by the fact that in any case perforations are produced which, if they are too closely packed, can decrease the mechanical strength of the resulting new product.

[0024] In order to provide the intended treatment, a loom of the quilting type is used to which hook-shaped needles, designated by the reference numeral 10, have been applied; said needles move at right angles to the fabric and extract the fibers of the yarns from the lower layer to insert them in the upper layer.

[0025] Substantially, therefore, the number of beats that the extractor performs in each instance in the advancement space of one centimeter, and the pitch, i.e., the number of needles aligned transversely to the advancement of the fabric per linear centimeter, become important.

[0026] Tests that have been carried out have shown that depending on the different types it is ideal to use a number of beats between 1 and 5 at a needle pitch of 1 to 5.

[0027] For best results it is advisable and ideal to choose long-fiber materials in order to obtain better mutual coupling of the fabrics.

[0028] With the chosen bonding method, the higher the count of the fabric, the larger the required number of extractions of fiber from the yarn per centimeter, with a consequent possible risk of fragility of the finished product, while when using a fabric constituted by yarns which have a low count according to metric measurement, the bonding process is easier and entails a lower pitch per millimeter.

[0029] The method for producing cohesion between two or more fabrics is ideal with fabrics made of mixed components such as wool/viscose, viscose/nylon, acetate/viscose and so forth because the interference of the process is produced in materials which react in a different but already-optimized manner and accordingly mutually intersect in the weft/warp weaves in an optimum manner.

[0030] The bonding principle devised considers the characteristic down of the yarn of each fabric chosen as means for the transport and coupling thereof to the opposite surface of another fabric or optionally of other additional fabrics superimposed thereon.

[0031] The resulting aesthetic effect is modified in each instance depending on the fabric from which the fiber inserted in the other fabric is extracted.

[0032] Merely by way of example, it is noted that composites have been produced by using a first layer of viscose with a count of 30 Ne, to which a second layer of cotton with a count of 40,000 Nm was bonded by using 5 beats per centimeter and a pitch of 5 needles per centimeter. Another type of bonding provides for a first layer of cashmere with a count of 115,000 Nm coupled to a second polyester layer with a count of 78 Td, with 4 beats per centimeters and a pitch of 3 needles per centimeter.

[0033] A non-woven polyester fabric with a count of 78 Td has also been bonded with a second layer of cashmere with a count of 140,000 Nm and printed viscose with a count of 30 Ne, with a process performed by means of 2 beats per centimeter and with a pitch of 2

needles per centimeter.

[0034] All the tests conducted have yielded optimum results, since it is possible to obtain a substantially infinite range of bondings with optimum production types.

[0035] From the above description it is thus evident that the invention achieves the intended aim and objects; in particular, the fact is stressed that a composite fabric and a method for producing it are provided which allow to modify the conventional criteria for bonding fabrics by utilizing a principle which provides a mechanical joining by interlacing fibers of one layer with the other layer, thus obtaining a mechanical cohesion which joins the fabrics without altering their tactile and mechanical characteristics.

[0036] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the inventive concept.

[0037] All the details may also be replaced with other technically equivalent elements.

[0038] In practice, the materials used, as well as the contingent shapes and dimensions, may be any according to requirements.

[0039] The disclosures in Italian Patent Application No. MI98A000671 from which this application claims priority are incorporated herein by reference.

[0040] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A composite fabric with mutually joined superimposed layers, characterized in that it comprises at least one first layer and at least one second layer which are mutually joined by means of fibers of yarn which protrude from one of said layers and are inserted through the other one of said layers, said fibers being retained in said other one of said layers in order to provide a stable bonding of said layers.

2. The composite fabric according to claim 1, characterized in that at least said layer from which said fibers of yarn protrude is provided by means of a textile layer.

3. The composite fabric according to claim 2, characterized in that the yarn that provides at least said textile layer has more than 700/800 twists.

4. The composite fabric according to claim 1, characterized in that said fibers are retained by the interlacing of the yarns on the other one of said layers.

5. The composite fabric according to claim 1, characterized in that it comprises a number of fibers arranged transversely to the fabric which is between 1 and 5 fibers per centimeter and, longitudinally with respect to the fabric, between 1 and 5 fibers per centimeter.

6. A method for producing a composite fabric, characterized in that it comprises the steps of: mutually superimposing at least two layers; introducing, through an upper layer, a plurality of hook-shaped needles which pass through said layers and take up fibers from a lower layer in order to carry said fibers through the upper layer.

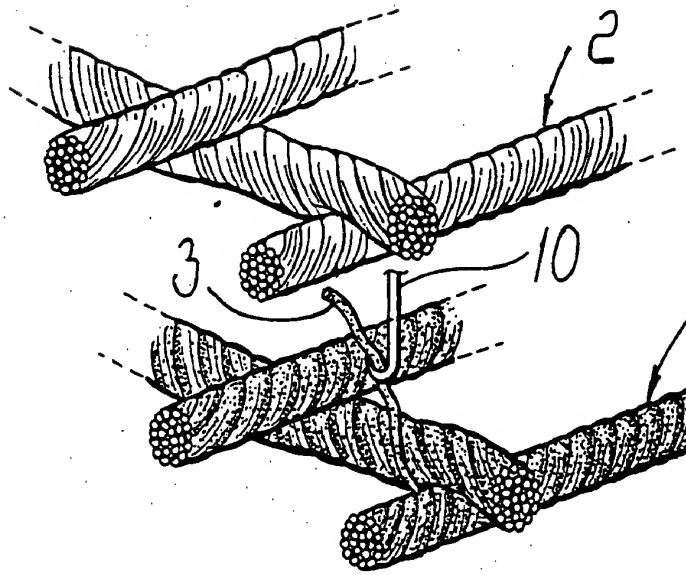

FIG. 1

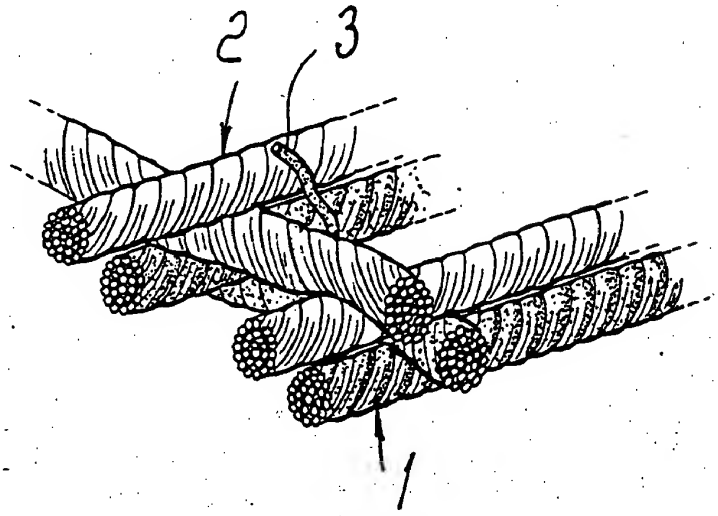

FIG. 2

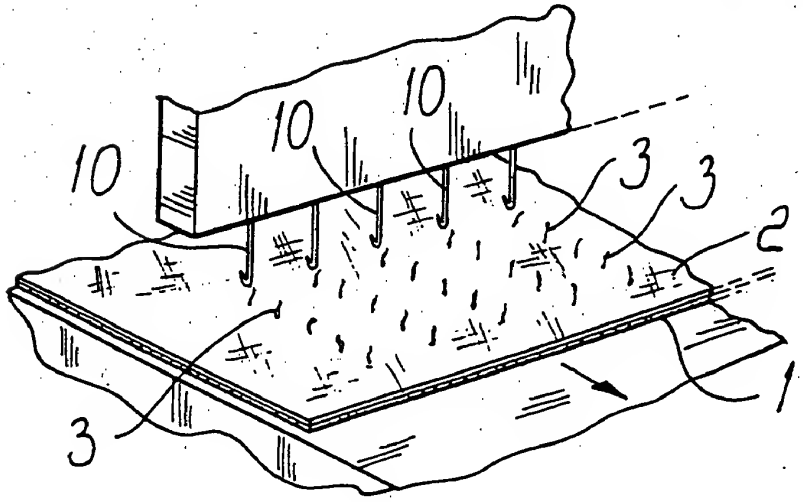

FIG. 3

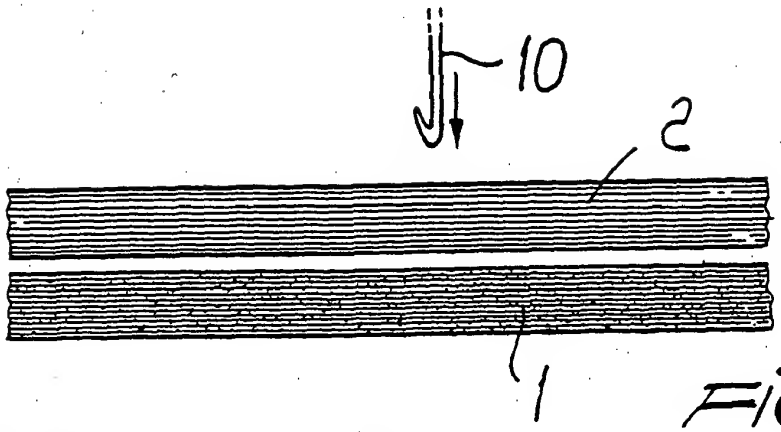

Fig. 4

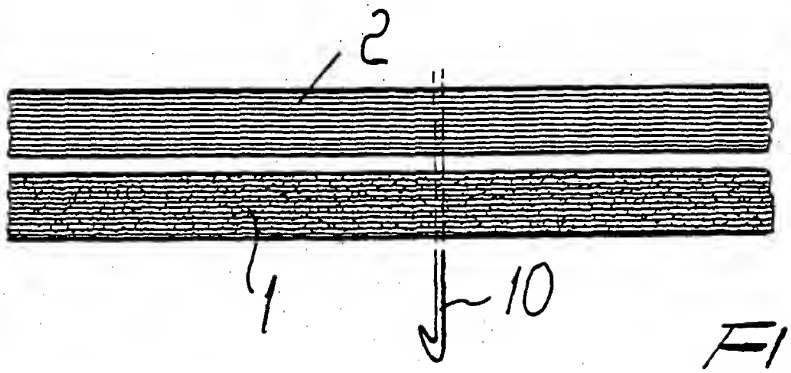

Fig. 5

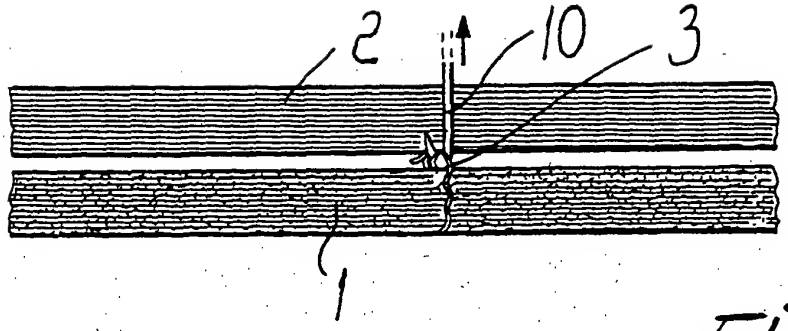

Fig. 6

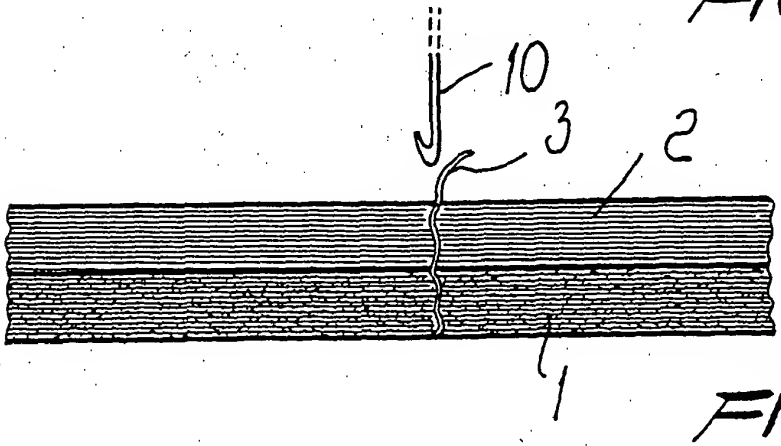

Fig. 7

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EUROPEAN SEARCH REPORT

Application Number
EP 99 10 5105

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	US 3 086 276 A (R. F. BARTZ ET AL) 23 April 1963 (1963-04-23) * the whole document *	1,2,4,6	D21F7/08 D21F1/00

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

D21F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	8 July 1999	De Rijck, F

CATEGORY OF CITED DOCUMENTS

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08-07-1999

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 3086276 A	23-04-1963	NONE	

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